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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/707,977	01/29/2004	Brian T. Denton	BUR920040007US1	1976

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EXAMINER

FLEISCHER, MARK A

ART UNIT	PAPER NUMBER
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3624

MAIL DATE	DELIVERY MODE
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03/18/2009

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/707,977	Applicant(s) DENTON ET AL.	
	Examiner MARK A. FLEISCHER	Art Unit 3624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 January 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-21 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 29 January 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>2 Feb. 2009, 16 Oct. 2008, 20 Feb. 2004 and 29 Jan. 2004</u> | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Status of Claims

1. This action is in reply to the Application filed on 29 January 2004.
2. Claims 1-21 are currently pending and have been examined.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. §112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 1-21 are rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

- **Claims 1, 8, 15 and 21:** These claims recite “smaller independent linear programs”, but the term ‘independent’ is misleading and confusing for if they were mathematically or probabilistically independent, they could not have come from the same parent from which they are decomposed. Hence, this inconsistency renders them vague and indefinite.
- **Claim 7:** the claim recites “said stocking point criteria relates...” where the term ‘relates’ is vague and indefinite as the elements of this relating is unstated, vague and a person of ordinary skill in the art would not be apprised of the scope of the claim.
- **Claims 8, 15 and 21:** recite the limitation "said material and balance constraints. There is insufficient antecedent basis for this limitation in the claim.
- **Claims 3, 10 and 17:** These claims recite “with the least complex” where the terms ‘least complex’ are vague and indefinite. The term complex can refer to any number of attributes and neither the claims nor the specification provide and concrete, unambiguous definitions of this term.

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- **Claims 10, 11, 12, 17, 18 and 19:** These claims recite “constraints that can be temporarily relaxed” where the term ‘temporarily’ is a relative term which renders the claims indefinite. The term “temporarily” is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.

Claim Rejections - 35 USC § 101

5. 35 U.S.C. §101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

6. Claims 1-20 are rejected under 35 U.S.C. §101 because the claimed invention is directed to non-statutory subject matter. Based on Supreme Court precedent, and recent Federal Circuit decisions, the Office's guidance to examiners is that a §101 process must (1) be tied to another statutory class (such as a particular apparatus) or (2) transform underlying subject matter (such as an article or materials) to a different state or thing. *Diamond v. Diehr*, 450 U.S. 175, 184 (1981); *Parker v. Flook*, 437 U.S. 584, 588 n.9 (1978); *Gottschalk v. Benson*, 409 U.S. 63, 70 (1972); *Cochrane v. Deener*, 94 U.S. 780, 787-88 (1876). An example of a method claim that would not qualify as a statutory process would be a claim that recited purely mental steps. Thus, to qualify as a §101 statutory process, the claim should positively recite the other statutory class (the thing or product) to which it is tied, for example by identifying the apparatus that accomplishes the method steps, or positively recite the subject matter that is being transformed, for example by identifying the material that is being changed to a different state. Examiner notes that while these claims do recite some components of the elements of another statutory class, they are insufficient to substantively tie them to another statutory class in that no correspondence is discernable between the various method steps and the particular components of the computer system.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. §103(a) which forms the basis for all obviousness rejections set forth in this Office action:

A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 1-21 are rejected under 35 U.S.C. §103(a) as being unpatentable over Hegde, et al. (US PgPub 20030065415 A1).

Claims 1, 8, 15 and 21:

Hegde teaches the following limitations as shown.

A method for solving a linear program having constraints in a production planning system, said method comprising:

- *determining which of said constraints can be temporarily relaxed based on stocking point criteria that relates to time dependent stocking points comprising part numbers, locations of parts identified by said part numbers, and the time periods when said parts will be available* (Hegde [0100] teaches that inputs to the LP model are adjusted to relax the LP model. Hegde [0099] bases the relaxation on the Bill of Materials.);
- *relaxing selected constraints of said linear program based on said determining process* (Hegde [0100].);
- *decomposing said linear program into smaller independent linear programs* (Hegde [title] teaches a decomposition system and method where decomposition means creating a number of smaller independent linear programs.);

Hegde does not specifically teach the following limitations,

- *initially solving said smaller independent linear program with relaxed constraints to produce an initial solution;*

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- *replacing variables in said linear program with constants based on said initial solution;*
- *restoring said material balance and sourcing constraints; and finally*
- *solving the linear program using said constants and with all constraints in place to obtain a complete solution of said linear program.*

but Examiner takes **Official Notice** that it is old and well-known as well as common place in the mathematical programming arts to incorporate the use of decomposition methods wherein constraints are initially relaxed, subproblems solved and constraints restored resulting in a solution using all constraints. Such methods such as first taught in Dantzig and Wolfe and also in Karabuk and Wu teach such techniques where the solution to a relaxed subproblem is used to provide a starting solution to the more complete problem wherein the decomposition is also modeled using stages as in dynamic programming stages wherein the solution of one stage serves as the controlling parameters for the succeeding stages. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the teachings of Hegde with was is old and well known in the art and apply the decomposition techniques using relaxed constraints to a complex supply chain problems (see also e.g., Eksioglu), would have been obvious to try relaxing certain of the constraints with certain characteristics as described above and that the technical capability to combine these teachings existed at the time of the invention where the results of such combination were predictable.

Claims 2, 9 and 16:

Hegde teaches the following limitations as shown.

- *before initially solving said linear program, decomposing said linear program into smaller independent linear programs, wherein said process of initially solving said linear program solves said smaller independent linear programs simultaneously in parallel (Hegde [0076] states “While the present invention is independent of the computer/system architecture, one advantages is the use of multiple solution methods by decomposing the problem into independent subproblems. Furthermore, the decomposition based approach is suitable for parallel programming to reduce computation time.” (emphasis added)).*

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Claim 3:

Hegde teaches the following limitations as shown.

- *selecting material balance and sourcing constraints that are associated with the least complex parts within bills-of-materials used by said linear program as said relaxed material balance and sourcing constraints* (Hegde [0036] states “In some simple cases the effect of binning is to link decisions about material releases between only two levels within the BOM. In more complex cases...When substitution decision affects are localized, heuristics provide adequate solutions; however, LP models are a better approach when the choice of an assembly to use to cover demand upstream in a supply chain affects the flow of material for all subassemblies, components, etc. throughout the supply chain.” Hegde [0100] teaches relaxing the LP model.)

Claim 4:

Hegde teaches the following limitations as shown.

- *selecting material balance and sourcing constraints that are associated with parts that have supply availability and lack capacity constraints as said relaxed material balance and sourcing constraints* (Hegde [0050] states “...automatically assigning part numbers to LP or Heuristic processing depending upon the complexity and connections of the part to other parts through the bills of material supply chain.” (emphasis added) and in [0085] states “a determination is made of which parts directly require LP processing because of their inherent complexity. Parts are considered inherently complex, and thus directly require LP processing...” *as said constraints that can be temporarily relaxed* (Hegde [0100] refers to a relaxed LP model)..

Claim 5:

Hegde teaches the following limitations as shown.

- *selecting material balance and sourcing constraints that are associated with parts that are available during the planning horizon of said linear program as said relaxed material balance and sourcing constraints* (Hegde [0050] states “...automatically assigning part numbers to LP or Heuristic processing depending upon the complexity and connections of the part to other parts through the bills of material supply chain.” (emphasis added) and in [0085] states “a

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determination is made of which parts directly require LP processing because of their inherent complexity. Parts are considered inherently complex, and thus directly require LP processing...” *as said constraints that can be temporarily relaxed* (Hegde [0100] refers to a relaxed LP model. Hegde [0138] “In each stage, the material requirements from the first pass are met as closely as possible given additional constraints resulting from limited supply availability and capacity resources.”).

Claims 6, 13 and 20:

Hegde teaches the following limitations as shown.

- *said planning horizon includes an initial planning horizon* (Hegde [0019] states “[A]dvanced production planning and scheduling decision support systems are typically run on a weekly basis, however, the planning horizon for such runs may range several years depending on the planning horizon of interest and the level of detail in forecasting.” (emphasis added), *shipping lead time* (Hegde [0106] “shipping lead time”), and *manufacturing cycle time* (Hegde [0012] states “At a macro level, the problem involves optimally balancing material flows across a supply/demand network given finite available capacity, geographically differentiated supply and demand locations, material processing costs, inventory holding costs, parametric data (e.g., product yields, cycle times, etc.) and the like.”).

Claims 7 and 14:

Hegde teaches the following limitations as shown.

- *said stocking point criteria relates to time dependent stocking points comprising part numbers, locations of parts identified by said part numbers, and the time periods when said parts will be available* (Hegde [0039] states “There are several key pieces of data that are required for EESCP. One key source of data is the Bill of Material (BOM). The BOM is the source of data that specifies components used in the assembly of each particular PN produced within the manufacturing system. The BOM can be used to generate a graphical representation of the stages within a manufacturing process for each of the produced finished products. The BOM also plays an important role in defining the structure of the supply-chain. For example, in FIG. 1, the

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aggregate stages involve many steps each of which can significantly impact the flow of materials through the manufacturing system.” (emphasis added) wherein ‘the flow...’ corresponds to relating to *the time periods...* See also Hegde [0023] *inter alia* and [0012] regarding inventory holding costs.).

Claims 10 and 17:

Hegde teaches the following limitations as shown.

- *said determining process identifies constraints that are associated with the least complex parts within bills-of-materials used by said linear program* (Hegde [0050] states “...automatically assigning part numbers to LP or Heuristic processing depending upon the complexity and connections of the part to other parts through the bills of material supply chain.” (emphasis added) and in [0085] states “a determination is made of which parts directly require LP processing because of their inherent complexity. Parts are considered inherently complex, and thus directly require LP processing...” *as said constraints that can be temporarily relaxed* (Hegde [0100] refers to a relaxed LP model).

Claims 11 and 18:

Hegde teaches the following limitations as shown.

- *said determining process identifies constraints that are associated with parts that have supply availability and lack capacity constraints as said constraints that can be temporarily relaxed* (Hegde [0138] “In each stage, the material requirements from the first pass are met as closely as possible given additional constraints resulting from limited supply availability and capacity resources.”).

Claims 12 and 19:

Hegde teaches the following limitations as shown.

- *said determining process identifies constraints that are associated with parts that are available during the planning horizon of said linear program as said constraints that can be temporarily relaxed* (see the rejection of claims 11 and 18. See also Hegde [0103]).

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Conclusion

Any inquiry of a general nature or relating to the status of this application or concerning this communication or earlier communications from the Examiner should be directed to **Mark A. Fleischer** whose telephone number is **571.270.3925**. The Examiner can normally be reached on Monday-Friday, 9:30am-5:00pm. If attempts to reach the examiner by telephone are unsuccessful, the Examiner's supervisor, **Bradley Bayat** whose telephone number is **571.272.6704** may be contacted.

The prior art made of record and not relied upon that is considered pertinent to applicant's disclosure are:

- Karabuk, et al. *"Coordinating Strategic Capacity Planning In The Semiconductor Industry"*.
- George B. Dantzig, G. B., et al. "Decomposition Principle for Linear Programs",
- Eksioglu, S. "Optimizing Integrated Production, Inventory And Distribution Problems In Supply Chains"
- Chu, S. "A mathematical programming approach towards optimized master production scheduling"
- Chen, H, et al. "A Lagrangian Relaxation Approach For Supply Chain Planning With Order/Setup Costs And Capacity Constraints"

and describe the use of mathematical programming techniques including relaxation and decomposition in the context of supply chain management.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://portal.uspto.gov/external/portal/pair> <<http://pair-direct.uspto.gov>>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at **866.217.9197** (toll-free).

Any response to this action should be mailed to:

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or faxed to **571-273-8300**.

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Examiner, Art Unit 3624

14 March 2009

/Bradley B Bayat/

Supervisory Patent Examiner, Art Unit 3624